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The so-called conducting tissue of the style consists of cells elongated in the direction of the long axis of the ovary, and differs in no material respect from that ordinarily seen. The pollen tube passes down the axial tissue of the style till near the cavity of the ovary, where it turns and passes down the ovary wall close to the margin of the cavity. The tissue through which it passes after leaving the style has nothing by which it could be designated "conducting tissue," but consists of nearly isodiametric cells. When a point is reached a little below the funiculus, the pollen tube curves, passes through a region of deeply-stained cells (as though mucilaginous), and when under the ovule turns upward towards the embryo sac.

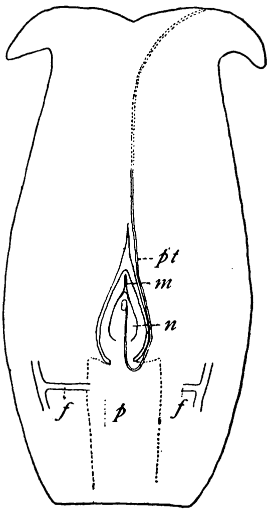

Diagram illustrating chalazogamy in the pecan: *p*, placenta, cut in the plane of fusion with the ovary wall; the approximate lines of fusion are represented by dotted lines; *f*, fibrovascular bundles running to the ovule; *n*, nucellus; *m*, micropylar canal; *pt*, pollen tube.

While the course of the tube is not difficult to see in the ovary wall, it is particularly conspicuous as it passes through the parenchymatous cells of the chalaza and nucellus. The account of the course taken by the pollen tube, as described above, is essentially that given by Nawaschin for Juglans. The branching of the tube recorded by Nawaschin appears to have its counterpart in the pecan. Although I have not settled this point by a number of observations, yet I did see a distinct branching in one case, and nearly every ovule examined showed the presence of more than one tube in the nucellus. If branching occurs, it takes place after the pollen tube has entered the subfunicular tissue.

Nothing definite has been made out as to the process of fertilization, or the nature of the embryo sac, but it is hoped that additional material will reveal something of interest along these lines.—FREDERICK H. BILLINGS, *Louisiana State University.*

SELECTED NOTES.

LEAF VARIATION IN *Liriodendron Tulipifera.*—A recent article by E. M. Berry on the phylogeny of Liriodendron (BOT. GAZ. **34**: 44–63. 1902) attracted my attention to the subject of leaf variation in this genus. The subject was mentioned to the students, and in a few days Mr. Ivey Lewis found a tulip tree with very variable leaves, from which we collected a number of forms. The tree was a fairly vigorous one, about eighteen feet high, growing on the edge of an open field. *Fig. 1* is from a photograph of six selected leaves from this tree. The type of variation represented by the two pointed leaves shown is of very rare occurrence in the living species, and apparently so far has been described by Berry only (Torreya 2:33. 1902). As the leaves of Liriodendron are usually considered remarkably constant to type, it was thought that a photograph of such widely different forms produced on the same tree might be of interest.

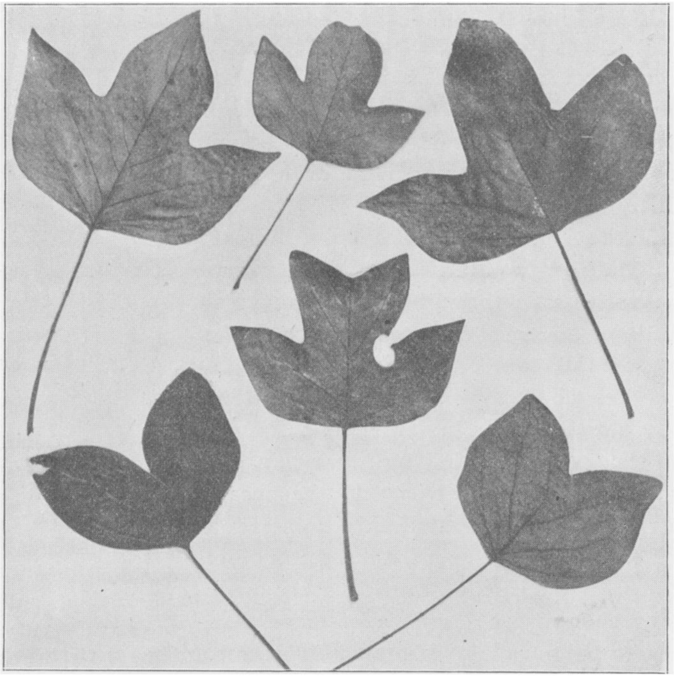

FIG. 1.—Photograph of six leaves from a single tree of *Liriodendron Tulipifera.* The tip of one leaf that was broken off after drying has been inserted in the photograph.

ON THE OCCURRENCE OF TWO EGG CELLS IN THE ARCHEGONIUM OF MNIUM.—While sectioning the female "flowers" of an undetermined species of Mnium, collected near Baltimore in the spring of

1900, an archegonium was found which contained two well-developed egg cells of perfectly normal appearance. The supernumerary one lay directly over the other, being inserted as a link in the axial row of cells present. *Fig. 2* represents their arrangement. Each egg has cut off its ventral canal cell above and is apparently ready for fertilization. One neck canal cell (*nc*) is shown. It seems probable that the upper egg cell has been derived from the lower neck canal cell by an abnormal modification of the latter. This is the only case, as far as I know, where two eggs have been observed in the archegonium of any of the archegoniates.

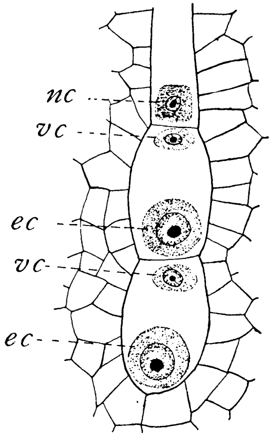

FIG. 2.—Part of venter of archegonium of Mnium, with two eggs and two ventral canal cells: *ec*, egg cell; *nc*, neck canal cell; *vc*, ventral canal cell. × 1050.

THE NUCLEUS OF THE SPORE CAVITY IN PROTHALLIA OF MARSILIA.—The nucleus left with the food material in the cavity of the megaspore on the formation of the prothallium seems to have been much neglected. Campbell (*Mosses and Ferns*, p. 404) figures this nucleus apparently disorganizing in *Marsilia vestita*, and speaking of Azolla says (*ibid.*, p. 384) "the nucleus of the lower cell remains in the upper part, and is much like that of the prothallial cell." With these exceptions this nucleus seems to have received little attention. While studying the prothallium of *Marsilia Drummondii*, notes were made on

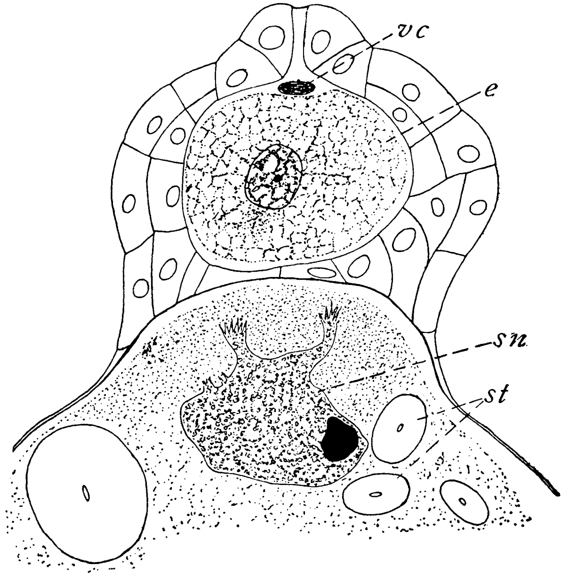

FIG. 3.—*Marsilia Drummondii*, showing upper part of megaspore with archegonium: *vc*, ventral canal cell; *e*, egg; *sn*, large nucleus in megaspore cavity; *st*, starch grains. × 670.

the intersporic nucleus which may be worth recording. The nucleus enlarges greatly as development proceeds, retains its position at the tip of the spore cavity, and at the time of fertilization is vastly larger than the nuclei of the remaining tissue, as shown in *fig. 3*. In this figure the peculiar shape of the nucleus attracts attention. Two long arms are projecting towards the prothallium, and other filaments extend upward from one side. The shape of the nucleus is not at all constant, but at this stage it is generally furnished with fine extensions radiating towards the prothallium. *Fig. 4* shows the nucleus of another spore at the same stage. As development proceeds, the nucleus fragments amitotically into a number of parts. *Fig. 5* represents two such fragments, one on each side, after the embryo has begun to develop. In *fig. 6* fragmentation has proceeded still further. The reticulum is throughout very dense and homogeneous and a nucleolus is present. It is hardly probable that the peculiar processes figured can be an artifact, as all other parts seem very well fixed. If these processes are normal, as seems probable, they recall the filaments extending from the nucleus into the food mass in the egg cell of Dytiscus (Wilson, *The Cell*, p. 115). In the case of Marsilia, however, the processes extend towards the tissue to be nourished, instead of towards the food material. The nucleus is here, doubtless, quite active in the elaboration or transference of food material, and it is not surprising that it should show special modification to this end. The final fragmentation reminds one of similar behavior of the nuclei in purely vegetable cells of Chara, Tradescantia, and many other plants.—W. C. COKER, *University of North Carolina, Chapel Hill.*

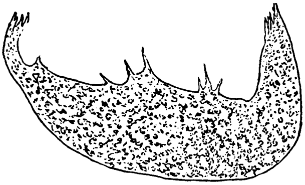

FIG. 4.

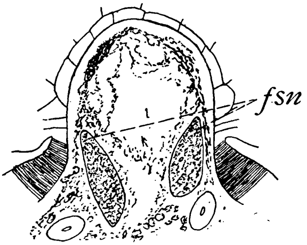

FIG. 5.

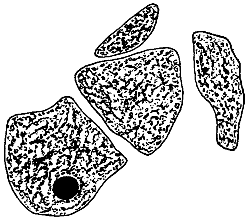

FIG. 6.

FIG. 4.—The same as *fig. 3*, showing nucleus of spore cavity. × 1050.

FIG. 5.—The same as *fig. 3*, showing papilla of spore cavity with two fragments of the nucleus (*fsn*); later stage than above. × 370.

FIG. 6.—The same as *fig. 3*, showing fragmentation carried still further. × 1050.